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WASTE DISPOSAL PRACTICES AT FEDERAL INSTALLATIONS. CHESAPEAKE BAY AREA OF MARYLAND EXCLUDING POTOMAC AND PATUXENT RIVER BASINS

Public Health Service
Charlottesville, Virginia

January 1965

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WASTE DISPOSAL PRACTICES

AT

FEDERAL INSTALLATIONS

CHESAPEAKE BAY AREA OF MARYLAND EXCLUDING POTOMAC AND PATUXENT RIVER BASINS

U. S. Department of Health, Education, and Welfare
Region III
Public Health Service
Division of Water Supply and Pollution Control
Charlottesville, Virginia

January 1965

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INTRODUCTION

The Maryland State Department of Health recently prohibited the harvesting of shellfish from several areas of the Chesapeake Bay due to water pollution. In order to determine the extent to which Federal installations may contribute to these unsatisfactory conditions, a review was made of practices at those installations which discharge waste effluents to the Chesapeake Bay system in Maryland. This report summarizes the waste disposal practices at all Federal installations, excluding those in the Potomac and Patuxent River Basins, which could affect the water quality of the upper Chesapeake Bay and sets forth recommendations for improvements where necessary. Two previous reports presented similar information on Federal installations in the Potomac and Patuxent River Basins.

The report has been prepared in cooperation with the Division of Environmental Engineering and Food Protection, Shellfish Sanitation Branch of the Public Health Service.

GENERAL DESCRIPTION

The Chesapeake Bay is a large estuarine system with a total drainage area of 67,000 square miles, covering parts of the States of New York, Pennsylvania, Maryland, Delaware, West Virginia, and Virginia. The surface area of the Bay, plus its tributary estuaries, is 3,260 square nautical miles. Waters of the Bay are used extensively for recreation, cooling water supplies, and sport and commercial fishing. The shellfish harvest in Maryland totaled 34.3 million pounds in 1963 and was valued at 9.3 million dollars.

WASTE DISPOSAL PRACTICES

Twenty-one Federal installations in the upper Chesapeake Bay area, excluding the Potomac and Patuxent River Basins, were considered to be located such that waste effluent discharges could conceivably affect the quality of shellfish growing waters in Maryland. Following are brief descriptions of those installations and their waste disposal practices, listed clockwise around the Bay. The locations of the installations are shown on Figure 1, inside back cover.

Cove Point Light Station

The Cove Point Light Station of the Coast Guard is located near the southern tip of Calvert County, Maryland. Sanitary wastes from three residence units with 15 persons and the radio building are discharged to a septic tank followed by a tile field. Seepage from the tile field to the ground surface has been observed. A new system consisting of a septic tank followed by a sand filter bed, from which no effluent is expected, has been planned and is expected to be completed by June 1965.

Naval Reserve Lab

The Naval Reserve Lab, located at Chesapeake Beach in Calvert County, Maryland, employs 350 to 400 persons. Approximately 38,000 gpd (gallons per day) of domestic wastes are treated in a secondary sewage treatment plant designed for 50,000 gpd,

consisting of primary sedimentation, secondary treatment by trickling filter, secondary sedimentation, post-chlorination, and sludge digestion and drying. Discharge is to the Chesapeake Bay. Periodic laboratory analyses of the plant effluent reveal good operation. BOD (biochemical oxygen demand) removal has been in excess of 90 per cent. Two septic tanks discharging to sub-surface systems receive 100 gpd from remote buildings. About 1,000 gpd of wasted cooling water are discharged from cooling towers of the air conditioning system to the Chesapeake Bay.

Thomas Point Shoal Light Station

Thomas Point Shoal Light Station of the Coast Guard is located in the Chesapeake Bay about 1.5 miles off of Thomas Point in Anne Arundel County, Maryland. Approximately 500 gpd of sanitary wastes are discharged to the Bay without treatment.

Coast Guard Station, Annapolis

The Coast Guard Station, Annapolis, is a search and rescue unit quartered in a two-deck barge docked near the mouth of Back Creek, a tributary of the Severn River in Anne Arundel County, Maryland. Out of a staff of ten, an average of five to eight men may be found aboard at any one time. Sanitary wastes are treated by two septic tanks in series and are chlorinated before discharging to the creek. This system is not considered to be satisfactory. Wastes from the galley, showers, lavatories,

and an automatic clothes washing machine discharge overboard with no treatment. Sanitary sewers of the City of Annapolis are available within a few hundred feet.

Naval Academy

The Naval Academy, located on the south side of the Severn River in Annapolis, Maryland, discharges approximately 1.18 mgd (million gallons per day) of domestic wastes to the Academy sewerage system, which is connected to the Annapolis City system. Approximately 175,000 gpd of laundry wastes are discharged to the Severn River without treatment. The Fiscal Year 1966 Military Construction Program includes plans for building a new laundry with construction planned for the spring of 1966. After completion, discharge of laundry wastes will be to the Academy sewerage system.

The Marine Engineering Laboratory, Naval Radio Station, Naval Station, Naval Small Craft Facility, and the Naval Academy Officer's Golf Association, all located on the north side of the Severn River opposite the Naval Academy, are served by a primary sewage treatment plant operated by the Naval Academy. Personnel plus dependents total about 2,200 persons, of whom about 1,500 are residents; and the Golf Association has 325 members. The plant, designed to treat 1.0 mgd, is presently receiving 430,000 gpd of domestic wastes. Treatment consists of pre-chlorination for odor control, sedimentation, post-chlorination, and sludge

digestion and drying. The plant effluent flows by gravity through a pipeline laid on the bottom of Carr's Creek and finally discharges about 1,500 feet out in the Severn River. A weir higher than the maximum high tide separates the effluent pipeline at the plant from the pipeline in Carr's Creek. While no chlorine contact chamber has been provided, calculations show that a contact time of about a half hour is provided by the outfall pipe. Approximately 8.4 mgd of cooling water are pumped from the Severn River and discharged back to the River with no chemicals added. The lower Severn River estuary is a "prohibited" shellfish harvesting area.

Ellicott City Post Office

The Ellicott City Post Office, located in Howard County, Maryland, discharges sanitary wastes directly to Tiber River without treatment. Post Office employees total 28 persons, and in addition, eight to ten persons in the County Agent's Office are located in the same building. No community sewerage system is available in Ellicott City; however, the County is currently developing a sewerage system program. All other buildings in the area also discharge wastes directly, without treatment, so that treatment of wastes from the Post Office, as a temporary measure, would have very little beneficial effect.

Fort McHenry National Monument and Historic Shrine

Fort McHenry, located in Baltimore, Maryland, and operated by the National Park Service, attracts about a half million people each year. Of these, perhaps two-thirds go to the Visitor Center and 50,000 to 60,000 pay admission to enter the Fort. The average attendance during August, the heaviest month, through the main gate is 3,300 persons per day. It is estimated that a maximum of 30,000 gpd of sanitary wastes are treated in two septic tanks. A 12,000-gallon septic tank serving the Visitor Center, discharges directly to the Northwest Branch, Patapsco River, and a 3,500-gallon septic tank receiving wastes from inside the Fort, discharges directly to the Patapsco River. City sewers are located about a quarter of a mile away, but on the other side of a ravine and at a higher elevation. This installation is located adjacent to an Army Corps of Engineers installation and a Navy Reserve Center, both discharging inadequately treated wastes. Therefore, consideration should be given to a cooperative effort by these agencies to connecting sanitary facilities to the City system or to constructing a common facility at one of the installations to provide adequate treatment.

Corps of Engineers Facility, Fort McHenry

The Corps of Engineers Facility at Fort McHenry, in Baltimore, Maryland, consists of two buildings. One building

contains a soils laboratory with ten persons and a navigation group with five persons. The second building is a warehouse with five persons. Another ten field personnel are present at the facility briefly each day. The total waste of about 450 gpd discharges without treatment directly to the Patapsco River. Since this facility is located adjacent to both Fort McHenry National Monument and the Naval Reserve Training Center, neither of which provide adequate treatment, consideration should be given to a cooperative program of waste disposal with those agencies. City sewers are located about a quarter of a mile away, but on the other side of a ravine and at a higher elevation.

Naval Reserve Training Center, Baltimore

The Naval Reserve Training Center, Baltimore, is located adjacent to Fort McHenry in the City of Baltimore, Maryland. The installation contains three buildings (only one in use at the present), a destroyer escort (DE-218), and a grounded submarine. Twenty-six assigned persons administer the Training Center; 58 men are aboard the destroyer escort full time; and approximately 275 persons attend training sessions for three hours on five nights per week and eight hours per day on weekends. About 30,000 gpd of domestic wastes are discharged directly to the Northwest Branch, Patapsco River, without treatment. Since this installation is located adjacent to both Fort McHenry

National Monument and a Corps of Engineers facility, neither of which have adequate waste treatment, consideration should be given to a cooperative program of waste disposal with those agencies. City sanitary sewers are located about a quarter of a mile away, but on the other side of a ravine and at a higher elevation.

GSA - DMS Depot, Curtis Bay

The Defense Materials Service of the General Services Administration operates the Curtis Bay Depot for the stock piling of strategic and critical materials for the Government in Anne Arundel County, just south of Baltimore, Maryland. The Army operates a Reserve Center on 20 acres of the total of 828 acres at the installation. A 20,000-gallon septic tank serves 22 DMS personnel and 20 Army personnel on an 8-hour, 5-day per week basis, 50 Army Reservists on Thursday evenings, and 500 Army Reservists one weekend each month, eight hours each of the two days. A mess hall is operated for the mid-day meal for two days one weekend a month. Also, one residence with two additional persons discharges to the tank. A 2,000-gallon septic tank serves 34 persons in a change house with showers. Both of the septic tanks overflow directly to Curtis Creek without further treatment. A 500-gallon septic tank serves one person at the guard house on each shift. Sanitary facilities at the pier on Curtis Creek serve two men during a regular work week and some

of the Reservists part-time during the summer, discharging apparently with no treatment.

One vehicle maintenance shop services Army vehicles and another shop services DMS vehicles. Some minor discharges to the storm drains of solvents, gasoline, oils, and radiator drainings were observed.

Coast Guard Yard, Curtis Creek

The Coast Guard Yard is located south of Baltimore in Anne Arundel County, Maryland. The installation is bordered by Curtis Creek, a tributary of Curtis Bay and the Patapsco River. It is the ship repair yard for Coast Guard vessels and headquarters for small craft surveillance. Population consists of 1,250 civilian employees, who work eight hours a day, and from 120 to 500 military personnel, who are residents.

Domestic wastes, estimated to be in the magnitude of 25,000 gallons per day during normal work days, are discharged from toilets and urinals to 15 septic tanks. One septic tank has sub-surface tile fields, seven overflow to Arundel Cove (a tributary of Curtis Creek), and seven overflow to Curtis Creek. Total tank capacity is reported to be 21,000 gallons. Coast Guard personnel indicated that the tanks are cleaned every spring by private contractor. Other sanitary wastes from showers, washbowls, etc., are estimated to be approximately 35,000 gallons per day and are discharged to storm sewers.

The Coast Guard vessels that operate out of Curtis Bay on various missions periodically return for supplies and repairs. While docked, domestic wastes are discharged overboard. No estimate is available as to what this volume may be. If vessels are docked for prolonged periods, the crews move into barracks located on the base.

Industrial wastes, for which an estimate is not available, are discharged untreated either into Arundel Cove or Curtis Creek, or are collected in containers and disposed of by commercial contract. The wastes originate from the many shops which carry on diverse activities in support of vessel repair and maintenance.

Fort Howard Veterans Administration Hospital

The Fort Howard VA Hospital, located in Baltimore County, Maryland, discharges about 100,000 gpd of wastes to the Patapsco River. Most of the wastes are not treated, the only treated effluents being from a few small septic tanks. A program of sewer construction is underway by the Baltimore County Department of Public Works to collect all of the wastes from the hospital for treatment at Baltimore City's Back River Sewage Treatment Plant by the end of calendar year 1965.

Naval Weapons Industrial Reserve Plant

The Naval Weapons Industrial Reserve Plant, located on

land leased from the Martin Company at Strawberry Point in Baltimore County, Maryland, carries out modification of aircraft, propulsion experiments, and acoustics testing. Approximately 200 persons are present during a normal working day. Sanitary wastes of about 7,000 gallons for eight hours each day are treated in a secondary sewage treatment plant designed to treat about 16,000 gallons for eight hours each day (a rate of 48,000 gpd) and consisting of sedimentation and digestion of sludge in a two-story circular tank, trickling filter, final sedimentation, chlorination with contact tank, and sludge drying. Discharge is to Frog Mortar Creek, a tributary of Middle River. Recirculation from the bottom of the final sedimentation tank to the primary sedimentation tank removes sludge from the final tank and provides adequate moisture and nutrients to the trickling filter during periods of low flow (nights and weekends). The final sedimentation tank was converted from a previously existing septic tank and has no provision to collect floating solids. The lack of this feature is probably not serious under present low flows, but in the event flows are increased substantially, the need for a skimming device should be determined. No apparent industrial waste problems exist, although the handling and storage of jet fuels present a potential problem from spillage, so that great care must be given in any transfer of the fuel. The General Services Administration has issued a permit to the

Air Force to use this installation for a three-year period, but the beginning date has not been settled.

Edgewood Arsenal

The Edgewood Arsenal of the Department of the Army, covering 4,700 acres near Edgewood, Maryland, in Baltimore County, has a population of 7,100, of which 3,200 are residents. Activities include research and development of chemical warfare agents, operation of a former Army chemical plant by the Diamond Alkali Chemical Company, and research and development by the Nuclear Research Labs. The Fourth Missile Battalion Headquarters is stationed at the Arsenal, and a battery is maintained near the Arsenal. A primary sewage treatment plant, consisting of comminution, sedimentation, and sludge digestion and drying, receives an average of 1.4 mgd of domestic wastes from the Arsenal and from Edgewood and vicinity. Discharge is to the Bush River. An additional 20,000 gpd from remote areas of the Arsenal are treated by septic tanks, some of which discharge to the Gunpowder or Bush Rivers or their tributaries, while others discharge to sub-surface tile fields. About 40,000 gpd of domestic wastes from the missile battery are treated by septic tank, followed by sand filtration and chlorination.

The chemical plant discharges to Canal Creek of the Gunpowder River approximately 600,000 gpd of cooling water (110° - 120°F.) and 150,000 gpd of industrial waste containing alkalies,

calcium carbonate, and chlorine from the manufacture of chlorine, caustic soda, and hydrogen from salt. An additional estimated 850,000 gpd of industrial waste containing organic solvents from the Chemical Research and Development Labs and caustic soda from the Bulk Operation Lab are discharged to the Bush River. A study by the Army Environmental Hygiene Agency in 1962 showed substantial bacterial contribution from the Arsenal to Bush River and also showed high pH values in Canal Creek, Gunpowder River, Kings Creek, and Bush River.

Aberdeen Proving Ground

Aberdeen Proving Ground, a large Army Post located in Harford County, Maryland, has two primary missions: (1) research, development, and engineering testing of Army material, and (2) ordnance and other military training. Employment totals approximately 10,700; some 5,000 of which are residents along with about 2,500 dependents. Most of the sanitary wastes are treated in two sewage treatment plants. In addition, a small primary plant serves the airport and discharges to Romney Creek, a tributary of the Chesapeake Bay; and 58 septic tanks with subsurface tile fields serve outlying areas. The Main Sewage Treatment Plant, with a design capacity of 2.8 mgd, receives an average flow of 1.35 mgd and consists of screening, sedimentation, and sludge digestion and drying. Effluent is discharged to Spesutie Narrows (a tidal basin artificially closed at the

northern end with the southern end open to the Chesapeake Bay). Spesutie Narrows is located within the boundaries of the reservation. The Pussey Sewage Treatment Plant, with a design capacity of 500,000 gpd, receives an average of 167,000 gpd from 670 Wherry Housing units. Treatment consists of screening, sedimentation and digestion of sludge in Imhoff tanks, secondary treatment by trickling filter, final sedimentation, and sludge drying. Effluent is discharged to Swan Creek, which is located outside the reservation and flows to the Chesapeake Bay. The unchlorinated effluents from both major sewage treatment plants could cause bacteriological contamination of the Chesapeake Bay. Industrial wastes consist mainly of vehicle wash waters.

Naval Training Center, Bainbridge

The Naval Training Center at Bainbridge, Maryland, in Cecil County, has a 24-hour population equivalent of about 7,100 (that is, counting an 8-hour employee as one-third equivalent and a full-time resident as one equivalent). Sanitary wastes from the Training Center, Manor Heights housing, and a county school, averaging 675,000 gpd, are treated in a secondary sewage treatment plant designed to treat an average flow of 3.0 mgd. (Some of the treatment units are out of service due to the reduced flows.) The treatment plant consists of grit chamber, pre-chlorinator, comminuter, primary settling basins, trickling filters, final sedimentation basins, post-chlorinator with

contact chamber, and sludge digesters and drying beds. The plant effluent discharges to the Susquehanna River below Port Deposit, Maryland. The well-treated and chlorinated effluent should have little effect upon the bacteriological quality of the river or the Chesapeake Bay.

Perry Point Veterans Administration Hospital

The Perry Point VA Hospital, located in Cecil County, Maryland, provides care for about 1,500 patients with a component of 1,200 employees. About 300 of the employees reside on the grounds with their dependents. Effective January 14, 1965, the approximately 500,000 gpd of domestic and industrial wastes generated by this installation received secondary treatment in the Perryville Sewage Treatment Plant. This treatment plant, owned and operated by the Town of Perryville, Maryland, is a modified activated sludge plant including primary clarifiers, combination aeration and settling tanks, heated digester, sludge drying beds, and chlorination. This well-treated and chlorinated effluent should have little effect upon the bacteriological quality of the Susquehanna River or the Chesapeake Bay.

Chesapeake and Delaware Canal Resident Office

The Chesapeake and Delaware Canal Resident Office of the Corps of Engineers is located at Chesapeake City, in Cecil County, Maryland. The Resident Office employs 69 persons, nine of whom

are present in the office during the working day, five days a week; and one person is present all other times. The remaining persons are present only at the beginning and the ending of the working day. About 600 gpd of sewage are treated in a septic tank and discharged directly to the Chesapeake and Delaware Canal.

Chesapeake City Light Attendant Station

The Chesapeake City Light Attendant Station of the Coast Guard is located at the Chesapeake and Delaware Canal Resident Office of the Corps of Engineers at Chesapeake City, Maryland. The Station has a component of four men who are present during the working day five days a week. The one building consists largely of shops for attending lights along the Chesapeake and Delaware Canal. One 40-foot buoy boat is maintained at the Station. Wastes are treated by a septic tank which discharges directly to a small boat basin along the Chesapeake and Delaware Canal. This procedure is unsatisfactory.

Kent County Nike Site

Nike Site No. 30 is located near Tolchester in Kent County, Maryland. The Control Area is served by two septic tanks with leaching wells. Three identical systems serve the MCA Housing Area and two sections of barracks at the Launch Area, consisting of septic tanks, sub-surface sand filters with underdrains,

and chlorination. Discharge from the sand filters, totaling about 6,000 gpd, is to a small tributary of Chesapeake Bay. This small amount of well-treated and chlorinated effluent would be expected to have very little effect upon the bacteriological quality of the tributary and of the Chesapeake Bay.

Coast Guard Station, Tilghman Island

The Coast Guard Station, Tilghman Island, located in Talbot County, Maryland, has a component of nine men. The Station is a search and rescue unit, as well as a light attendant station. It is located in one building, and waste disposal is through a septic tank and sand filter bed. No discharge has been observed from the bed to date.

MARYLAND'S CLASSIFICATION PROGRAM FOR SHELLFISH GROWING AREAS

Part I of the Manual of Operations of the Cooperative Program for the Certification of Interstate Shellfish Shippers, Public Health Service Publication No. 33, stipulates that shellfish growing areas are categorized according to four classifications: "approved," "conditionally approved," "restricted," and "prohibited."

The Maryland State Department of Health, as a participant in the cooperative State-Public Health Service-industry program for the certification of interstate shellfish shippers, currently uses two classifications for all shellfish production waters. All shellfish areas are designated as either "approved" or "prohibited." However, since about November 1, 1964, predelineated temporary closure areas have been established within "approved" areas, subject to possible sewage influence in the event of treatment plant by-passing or failure. This is essentially consistent with the "conditionally approved" concept used in the cooperative shellfish program.

The shellfish harvesting areas in Maryland waters covered by this report, classified as "prohibited" as of December 1, 1964, are shown on Figure 1. All other areas are classified as "approved."

CONCLUSIONS

1. Six of the 21 Federal installations in the Chesapeake Bay area of Maryland, excluding the Potomac and Patuxent River Basins, provide a satisfactory degree of treatment for sanitary wastes. These installations are: Naval Reserve Lab at Chesapeake Beach; Naval Weapons Industrial Reserve Plant at Strawberry Point; Naval Training Center at Bainbridge; Kent County Nike Site near Tolchester; Coast Guard Station, Tilghman Island; and Perry Point VA Hospital.

2. At the Cove Point Light Station, seepage of septic tank effluent from the tile field to the ground surface presents an unsatisfactory condition. The problem has been recognized by Coast Guard authorities, and plans for a new disposal system are complete.

3. The Thomas Point Shoal Light Station provides no treatment for sanitary wastes.

4. The Coast Guard Station, Annapolis, provides inadequate treatment of sanitary wastes. The problem has been recognized by the Coast Guard authorities, and plans are underway to connect to the Annapolis sewerage system.

5. Laundry wastes from the Naval Academy are discharged directly to the Severn River without treatment. The Severn River and adjoining areas of the Chesapeake Bay are highly utilized for recreation and for Naval Academy boating activities,

so that a high degree of protection of the waters is necessary.

6. The Post Office at Ellicott City provides no treatment of sanitary wastes. However, plans for a sewerage system are underway by Howard County, and it is anticipated that the Post Office will connect to this system when it becomes available. Short term remedial measures would have little beneficial effect, because all other buildings in the area provide no treatment.

7. At Fort McHenry National Monument and Historic Shrine, the septic tanks are not considered as adequate treatment devices.

8. The Naval Reserve Training Center, Baltimore, provides no treatment of sanitary wastes.

9. The Corps of Engineers Facility at Fort McHenry provides no treatment of sanitary wastes.

10. At the GSA-DMS Depot, the septic tanks are not considered as adequate treatment devices. Some minor discharges of solvents, gasoline, oil, and radiator drainings to storm drains were observed.

11. At the Coast Guard Yard, Curtis Creek, 14 septic tanks which overflow are not considered to constitute adequate treatment. The discharge of other sanitary wastes to storm drains is also not acceptable. The untreated discharge of industrial wastes from various activities also contributes to

pollution of Curtis Bay.

12. The Fort Howard VA Hospital provides no treatment of sanitary wastes. However, plans are underway to connect to the Baltimore sewerage system during 1965.

13. Inadequate treatment of wastes from the Fort McHenry National Monument, the Corps of Engineers Facility at Fort McHenry, the Naval Reserve Training Center at Baltimore, the Curtis Bay GSA-DMS Depot, the Curtis Creek Coast Guard Yard, and the Fort Howard VA Hospital represents a health hazard due to the fact that these discharges occur in a potential shellfish harvesting area subject to "sport harvesting" at this time.

14. At the Edgewood Arsenal, chlorination of the effluent from the primary sewage treatment plant is not provided. A higher degree of treatment is needed, considering the high recreational use of the receiving waters and the location of an "approved" shellfish area immediately downstream from the installation. Waters receiving domestic and industrial wastes have been observed to have excessive bacteriological and pH levels. Several septic tanks discharge directly to surface waters.

15. At the Aberdeen Proving Ground, chlorination of the effluents from both major sewage treatment plants is not provided. A higher degree of treatment is needed at the main plant, considering the high recreational use of the Chesapeake Bay and the location of an "approved" shellfish area immediately downstream from the installations.

16. At the Chesapeake and Delaware Canal Resident Office, the septic tank is not considered as an adequate treatment device.

17. The Chesapeake City Light Attendant Station provides no treatment of sanitary wastes.

RECOMMENDATIONS

1. The Cove Point Light Station should be provided with a new septic tank and sub-surface disposal system, as planned.

2. The Thomas Point Light Station should provide adequate treatment of sanitary wastes.

3. The Coast Guard Station, Annapolis, should connect to the Annapolis sewerage system, as planned.

4. At the Naval Academy, plans should be developed to provide secondary treatment including chlorination.

5. A cooperative program of waste disposal should be developed by the Naval Reserve Training Center, Fort McHenry National Monument, and the Corps of Engineers Facility, Fort McHenry. Consideration should be given to connecting to the Baltimore sewerage system.

6. The GSA-DMS Depot should provide sub-surface disposal of septic tank effluents, or an alternate plan for secondary treatment including chlorination should be developed.

7. The Coast Guard Yard, Curtis Creek, should conduct an engineering study to develop plans for adequate collection and treatment of sewage and industrial wastes. Such plans should include provisions for:

   a. Collection of all sanitary wastes, including wastes from showers, wash basins, etc., now discharging to storm sewers.

b. Collection and proper treatment of all industrial wastes. Separate treatment should be provided if these wastes are not amendable to conventional sewage treatment processes.

c. Provision in the collection system to care for wastes emanating from docked vessels.

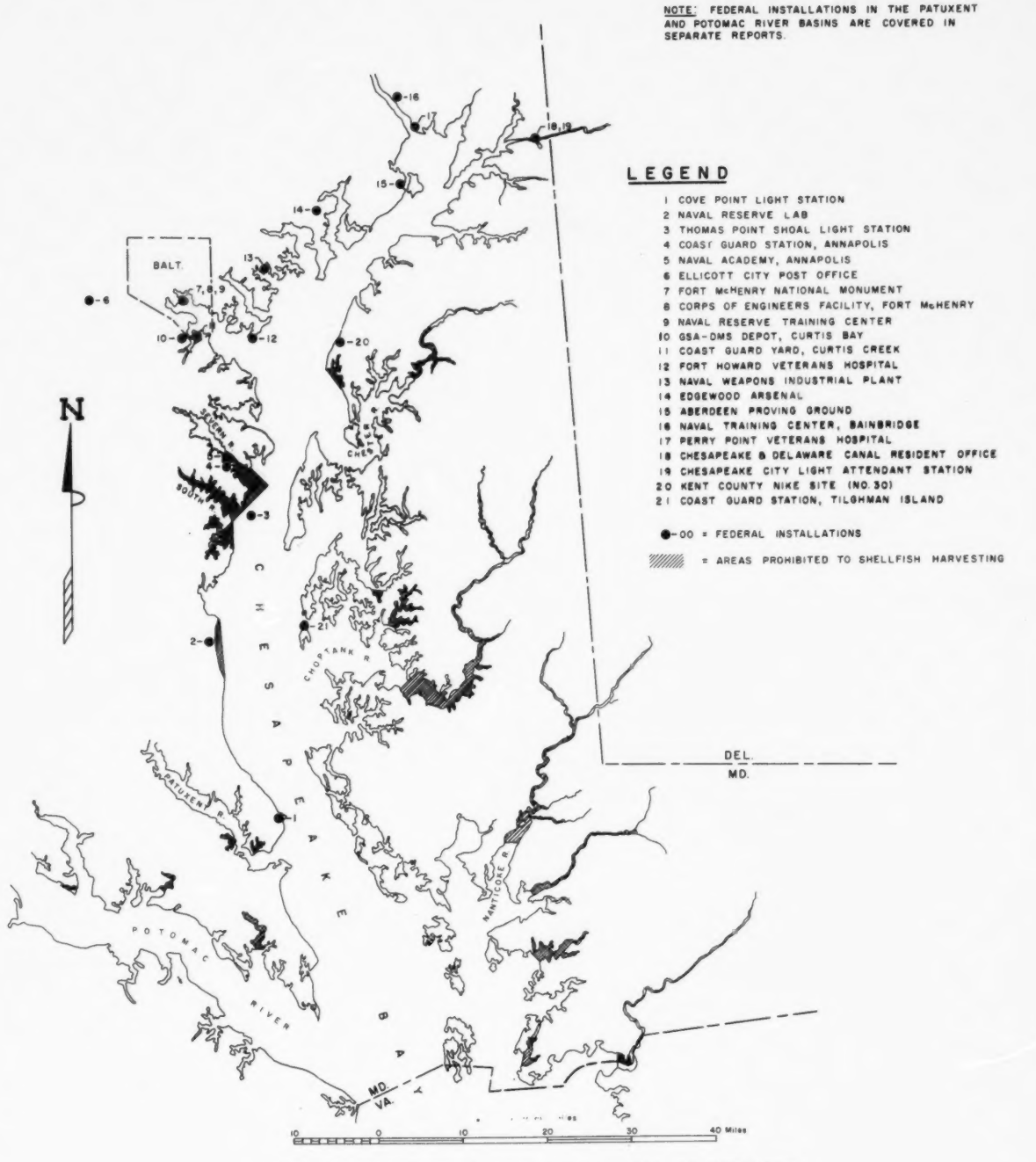
d. Secondary type waste treatment facilities, including chlorination of plant effluent.

8. Edgewood Arsenal should provide chlorination of waste effluent from the primary sewage treatment plant as soon as possible. Plans should be developed to provide secondary treatment including chlorination in the near future. All septic tanks discharging to surface waters should be provided with subsurface disposal of effluents, or the contributing facilities should be connected to the Arsenal sewerage system. Additional data should be obtained to determine whether industrial wastes from the Arsenal are causing pollution of receiving waters.

9. The Aberdeen Proving Ground should provide chlorination of waste effluent from both major sewage treatment plants as soon as possible. Plans should be developed to provide secondary treatment of all wastes, including chlorination, in the near future.

10. The Chesapeake and Delaware Canal Resident Office and the Chesapeake Light Attendant Station should either be connected to the Chesapeake City sewerage system or a plan for providing secondary treatment with chlorination should be developed.

11. Federal installations should make arrangements for notification to the Maryland Department of Health in the event of plant malfunction or chlorination failure.


NOTE: FEDERAL INSTALLATIONS IN THE PATUXENT AND POTOMAC RIVER BASINS ARE COVERED IN SEPARATE REPORTS.
LEGEND
1 COVE POINT LIGHT STATION
2 NAVAL RESERVE LAB
3 THOMAS POINT SHOAL LIGHT STATION
4 COAST GUARD STATION, ANNAPOLIS
5 NAVAL ACADEMY, ANNAPOLIS
6 ELLICOTT CITY POST OFFICE
7 FORT McHENRY NATIONAL MONUMENT
8 CORPS OF ENGINEERS FACILITY, FORT McHENRY
9 NAVAL RESERVE TRAINING CENTER
10 GSA-DMS DEPOT, CURTIS BAY
11 COAST GUARD YARD, CURTIS CREEK
12 FORT HOWARD VETERANS HOSPITAL
13 NAVAL WEAPONS INDUSTRIAL PLANT
14 EDGEWOOD ARSENAL
15 ABERDEEN PROVING GROUND
16 NAVAL TRAINING CENTER, BAINBRIDGE
17 PERRY POINT VETERANS HOSPITAL
18 CHESAPEAKE & DELAWARE CANAL RESIDENT OFFICE
19 CHESAPEAKE CITY LIGHT ATTENDANT STATION
20 KENT COUNTY NIKE SITE (NO. 30)
21 COAST GUARD STATION, TILGHMAN ISLAND
●-00 = FEDERAL INSTALLATIONS
= AREAS PROHIBITED TO SHELLFISH HARVESTING
N
BALT.
CHESAPEAKE BAY
PATUXENT R.
POTOMAC RIVER
CHOPTANK R.
NANTICOKE R.
SEVERN R.
SOUTH R.
CHES.
DEL.
MD.
MD.
VA.
10 0 10 20 30 40 Miles

FEDERAL INSTALLATIONS — CHESAPEAKE BAY AREA OF MARYLAND

FIGURE 1